

Browning

**Installation and
Maintenance Manual
for FCR Equipped Motors
and Gearmotors**

Emerson Industrial Automation

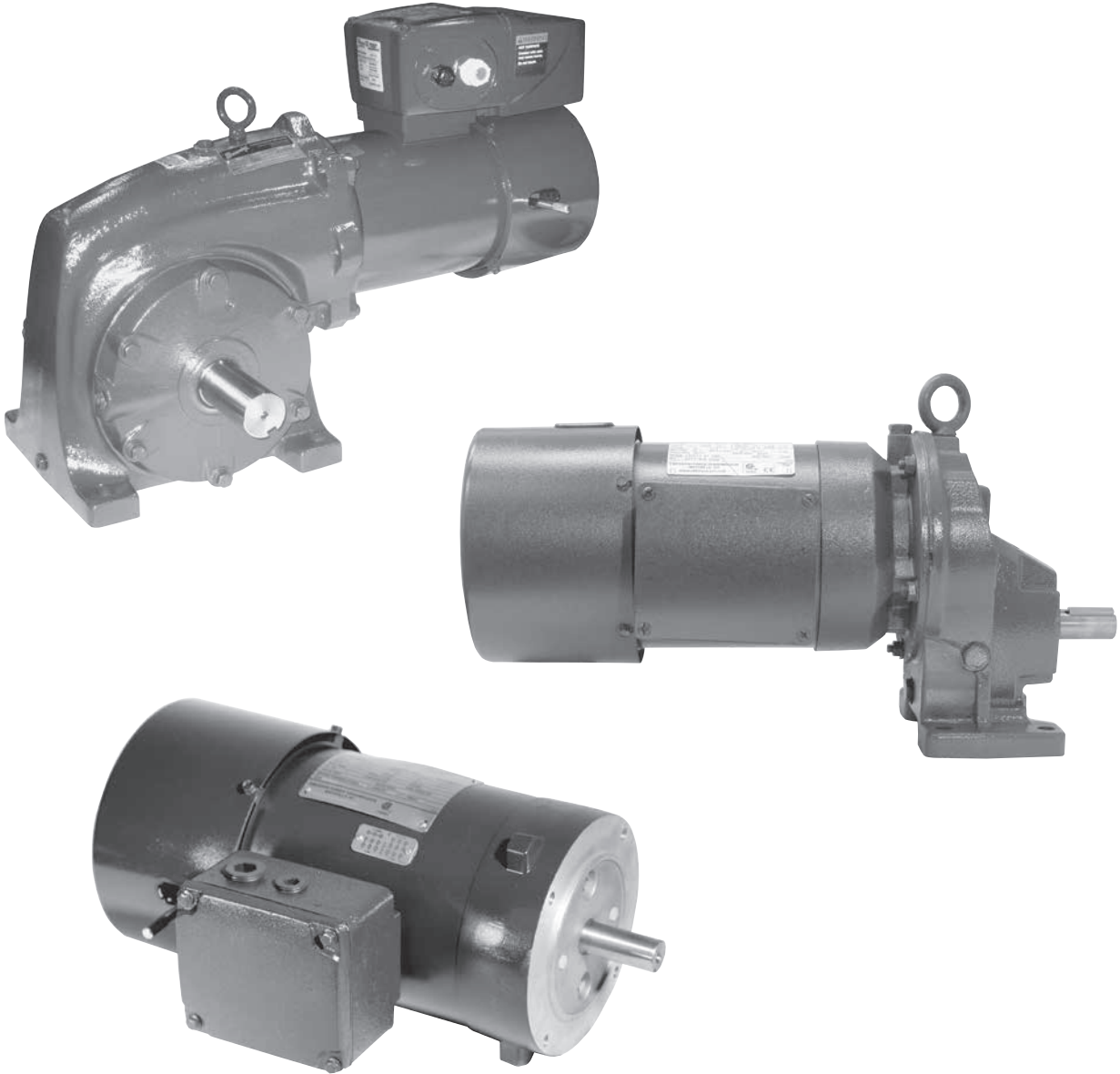
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FORM

9055E

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⚠ WARNING

- Read and follow all instructions carefully.
- Disconnect and lock-out power before installation and maintenance. Working on or near energized equipment can result in severe injury or death.
- Do not operate equipment without guards in place. Exposed equipment can result in severe injury or death.

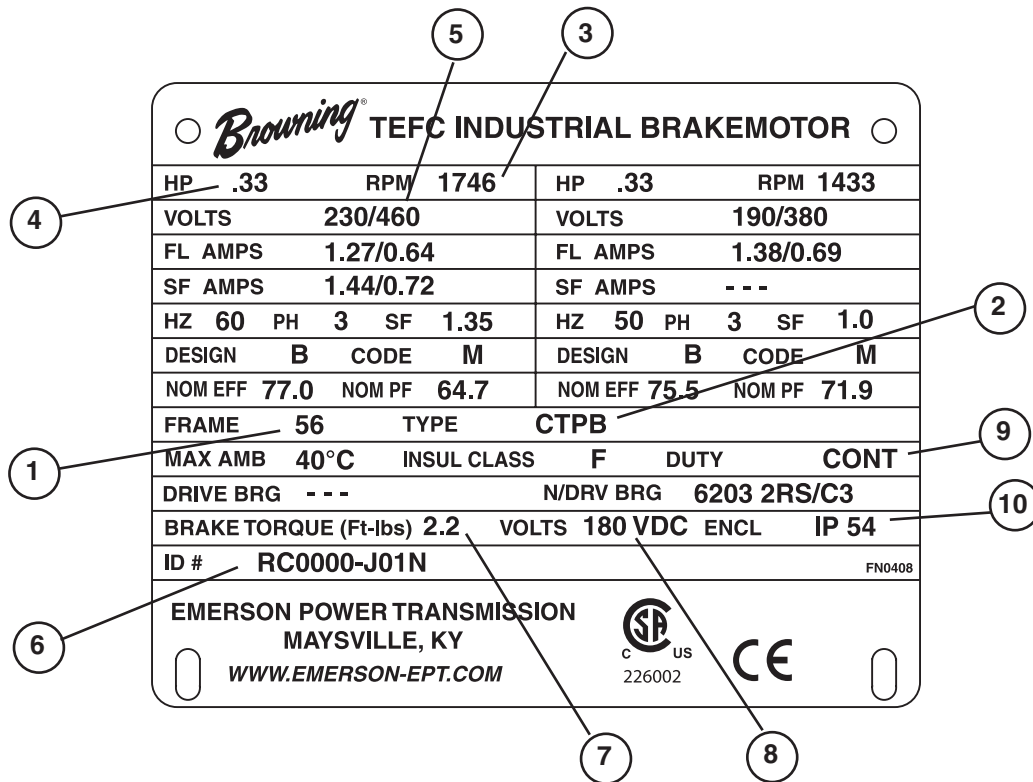
⚠ CAUTION

- Periodic inspections should be performed. Failure to perform proper maintenance can result in premature product failure and personal injury.
- All electrical work should be performed by qualified personnel and compliant with local and national electrical codes.

1 Receipt Inspection

Upon receipt, check the condition of the brake - should the motor or brake or even the packaging be damaged in any way, inform the carrier. Check the brakemotor and gear nameplate to make sure it conforms with the order specifications (mounting arrangements, etc.)

1.1 Brakemotor Nameplate



Item #	Nameplate details
1	Motor frame
2	Motor/brake type
3	Motor speed in rpm
4	Motor HP
5	Motor voltage

Item #	Nameplate details
6	Manufacturing ID #
7	Braking torque (ft.lbs.)
8	Brake coil voltage (VDC)
9	Duty cycle
10	Brake Enclosure

2 Storage

Store the equipment in a clean, dry place that is protected from shocks, vibration and temperature fluctuations and with relative humidity levels of less than 90%.

3 Installation

3.1 Mechanical Installation

Allow a minimum of 8.3 inches of clearance between the fan cover guard of the brakemotor and any surface to allow room for removing the fan cover guard and servicing or adjusting the brake.

3.2 Electrical Installation

Make all electrical and grounding connections in accordance with all national, and local codes. When these motors are supplied with normally closed thermostats, they should be wired to the holding coil of a motor starter and are not designed for power input.

Power Supply (see connection diagrams on page 4)

Brake motors with built-in power supply can be connected in the same way as a standard motor. They are fitted with a 180V DC coil. The brake is directly supplied from the motor stator (230/460, 575V) via a brake power supply unit with the rectifier mounted in the terminal box.

NOTICE: When the motor is started with reduced voltage or variable frequency power, the brake must be supplied with power separate from the motor. The reduced voltage will likely not release the brake, and thus cause motor and brake damage.

Brakemotors designed specifically for operation from VFD power sources will have a 100 VDC brake coil and the rectifier. These 100 VDC brakes require a separate fixed frequency 115 or 230 VAC power source.

For shorter brake set times to prevent coasting potentials, it's necessary to use an auxiliary contact from the motor start and connect it to the rectifier as shown in the wiring diagrams as location "A".

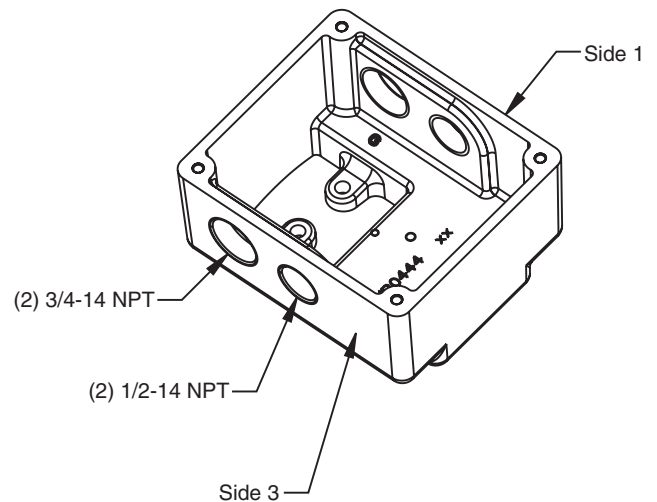
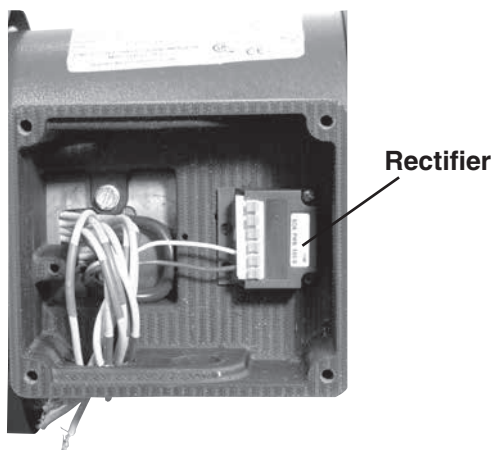
3.3 Brakes with manual release lever

To manually release the brake, exert pressure on the manual release handle towards the non-drive end of the motor.

Make sure to re-set it after maintenance is complete.

The terminal box on a brakemotor or brake gearmotor is supplied with two (2) threaded openings on side 1 and 3. See diagram below.

Each of these openings are supplied with a threaded plug allowing removal of any or all plugs for required cable entry. Keeping plugs in unused locations preserves the enclosure integrity of the motor and brake.



3.4 Electro-magnetic characteristics @ 20°C ± 5%

Motor Frame	180 VDC Brake Coil			100 VDC Brake Coil		
	Current	Resistance	Power	Current	Resistance	Power
	A	Ω	W	A	Ω	W
56 or 56C	0.31	572	57	0.54	186	54
140T or 140TC	0.31	572	57	0.54	186	54
180T or 180TC	0.35	510	64	0.65	155	65

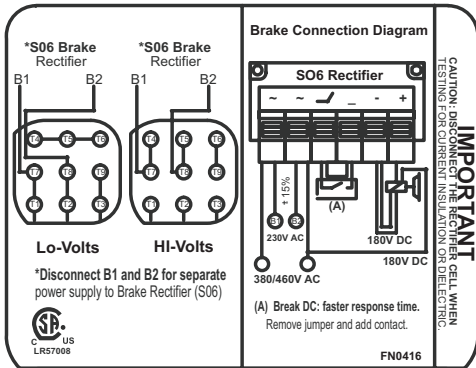
3.5 Wiring diagrams

3.5.1 Fixed Frequency

Three phase brake motors operated from a fixed frequency power supply are supplied with onboard rectifiers in the conduit box to allow powering the brake rectifier directly from the motor. Two versions of rectifiers (SO6 and SO8) can be used interchangeably. Note the rectifier in the motor being wired.

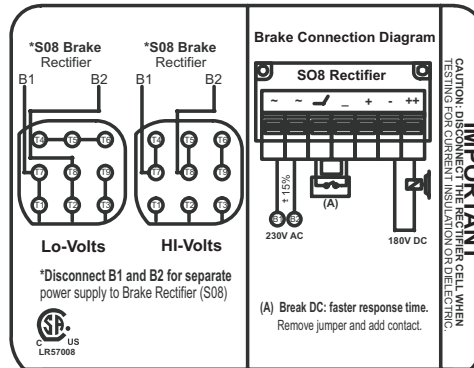
3.5.1.1 Three phase 230/460, 190/380V

SO6 Rectifier

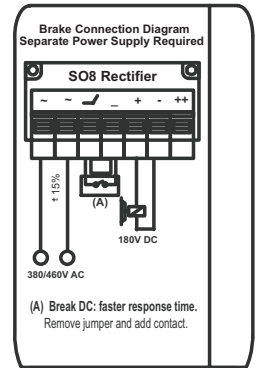


230v or 460v or 380v

SO8 Rectifier



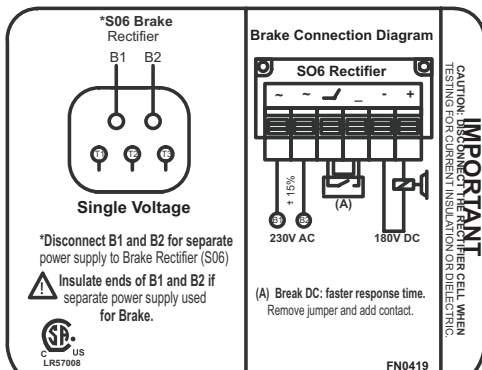
230v



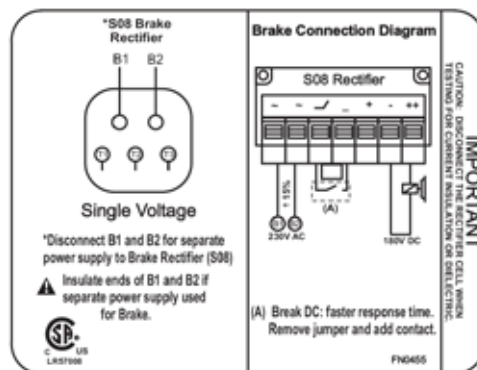
460v or 380v

3.5.3 Three phase 575V

SO6 Rectifier



SO8 Rectifier

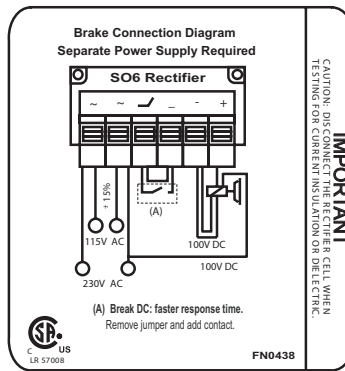


IntelliGear® wiring with ESFR card (see IntelliGear Plus™ Manual Form 9112).

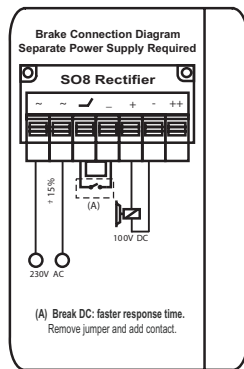
3.5.2 Variable Frequency

Three phase brake motors operated from a variable frequency power supply are designed with onboard rectifiers in the conduit box to allow powering the brake rectifier from a 115V or 230V fixed frequency single phase power separate from the motor/VFD but interlocked with that power source such that both motor and brake get powered simultaneously. Two versions of rectifiers (SO6 and SO8) can be use inter-changeably. Note the rectifier in the motor being wired.

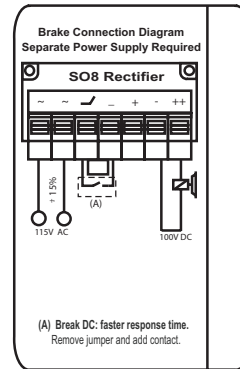
3.5.2.1 SO6 Rectifier



3.5.2.2 SO8 Rectifier



230V



115V

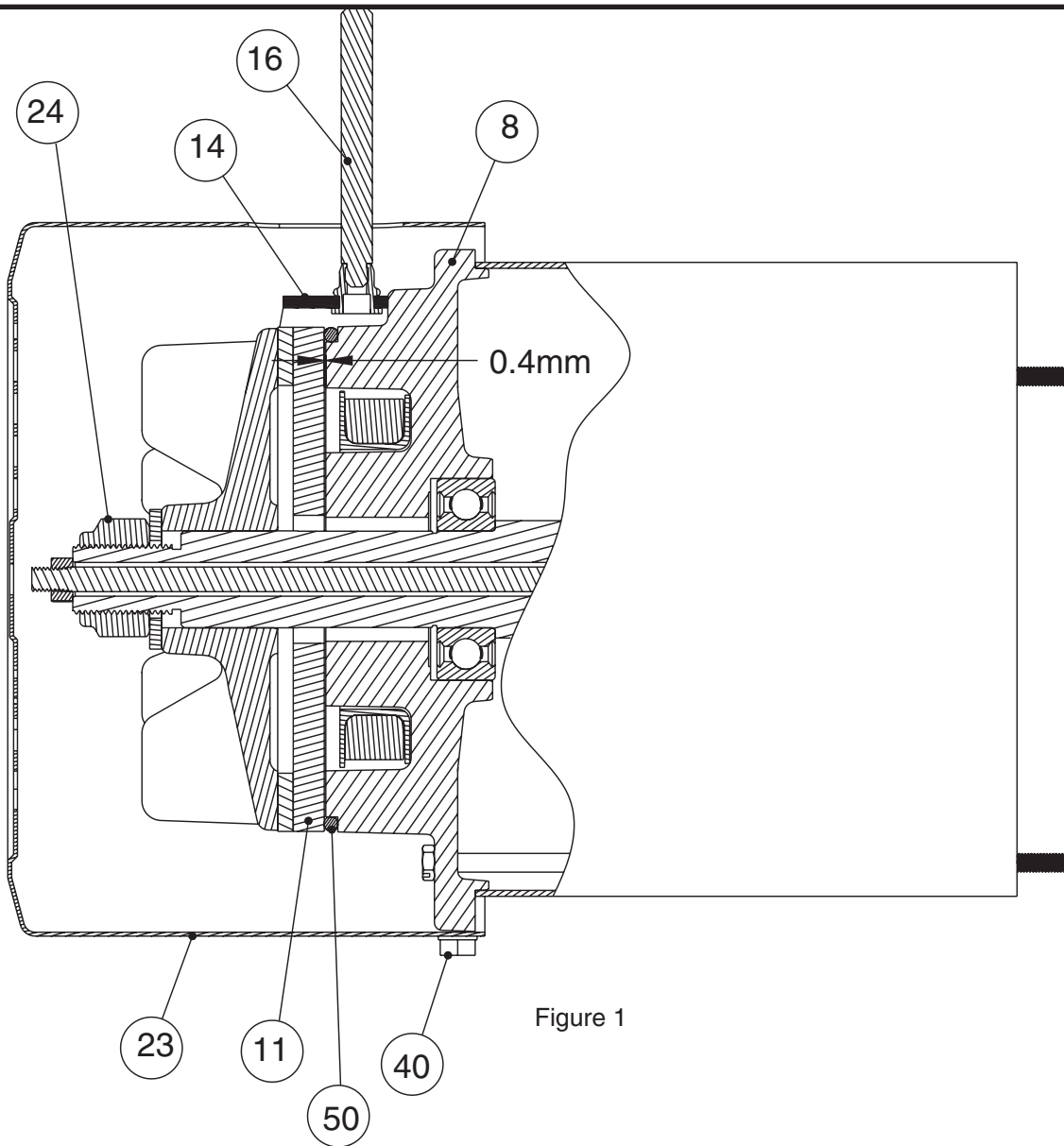


Figure 1

4 Maintenance*

4.1 Adjustments

Adjusting the air gap: (Figure 1)

The air gap needs to be adjusted when the mechanical release mechanism no longer functions normally.

- Unscrew the manual release handle (16) when it is supplied.
- Unscrew the 4 cover screws (40) which are securing the fan cover guard (23) on the motor.

- Remove the fan cover guard (23). Remove manual release (14) and remove the sealing o-ring (50). Clean the parts by removing the friction lining dust. Insert a 0.4 mm (0.016 in.) shim between the brake housing (8) and the armature (11). Tighten the brake nut (24) so as to obtain a working gap of 0.4 mm distance between the armature (11) and the brake housing (8). The shim should slip slightly.

- Remove shim.
- Replace the sealing o-ring (50).

Replace the fan cover guard (23) and tighten the fan cover screws (40).

- Replace the manual release handle (16) (if supplied).

* See page 7 for exploded view and parts lists.

4.2 Disassembly and reassembly of the brake manual release (default option) (Figure 2)

Disassembly of the brake manual release:

- Unscrew the handle (16) of the manual release (14) (if supplied).
- Remove the fan cover screws (40) which are securing the fan cover (23) in place.
- Remove the two screws (12) on the manual release (14) and release the spring (13).
- Remove the manual release (14).

Reassembling the brake manual release:

- Position the brake manual release (14) around the brake housing (8).
- Install screw (12) on the left to affix the manual release (14).
- Install screw (12) with spring on right with large end of spring engaged into hole in housing (8) (see Figure 2). Tighten screw (12). Once screw is tightened, set short end of spring under manual release notch (see Figure 2).
- Assemble the fan cover guard (23) with screws (40).
- Remove the rubber plug in the fan guard and assemble the handle (16) (if required) to release the brake manually.

4.3 Changing brakemotor on modular gear

Removing brakemotor from gear:

- Remove fan cover guard (23) from motor.
- Remove brake nut (24) while holding fan (15) stationary. Remove washer (20).
- Disassemble manual release per 4.2 above.
- Remove the motor stud nut (25) and motor stud (61).
- Use bearing puller to remove fan (15) and brake armature (11) together.
- Follow "Modular Motor Disassembly" instructions, which are supplied with the replacement brakemotor, to now remove the motor rotor and stator.

Reinstalling new brakemotor onto gear with modular tapered input connection:

- Clean female taper of new motor's shaft completely with petroleum solvent.

NOTICE: Do not lubricate the female taper end of the motor shaft or the male taper of the reducer shaft. Lubrication could cause the connection to slip in service

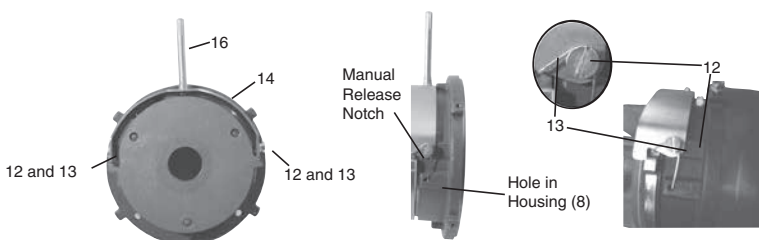
- Keeping rotor (2) and stator (1) together, rotate rotor/brake until pair of tapped holes in brake housing (8) are at 90 degrees from where manual release handle (16) is desired.
- Install the 4 stator bolts (5) through brake housing (8) and stator assembly and engage them into gear input bracket. Tighten in alternating rotating pattern.
- Install and tighten rotor stud nut per "Modular Motor Assembly" instructions supplied with replacement brakemotor.
- Hold brake fan with an adjustable wrench to prevent rotation, insert 0.4 mm shim between brake housing (8) and armature plate (11). Tighten brake nut (24) to just before shim is captive but less than .50 mm shim.
- Replace the sealing o-ring (50).
- Reassemble the brake manual release components per 4.2 above if required to original orientation.
- Assemble the brake fan cover guard (23) using 4 screws (40).
- Replace manual release handle (16) (if required).

4.4 Braking torque (ft. lbs.)

The table below defines the standard braking torque rating for the FCR brakemotor or gearmotor designs:

Motor HP / Poles	Frame	Brake Rating (FT. Lbs.)	Springs Qty and Color
0.33 HP / 4	56/56C	2.2	4 blue
0.50 HP / 4	56/56C	2.5	6 blue
0.75 HP / 4	56/56C	4.4	3 green
1.00 HP / 4	143T/56C/143TC	5.9	4 green
1.50 HP / 4	145T/145TC	7.4	5 green
2.00 HP / 4	145T/145TC	8.85	6 green
3.00 HP / 4	182T/182TC	15	4 grey
5.00 HP / 4	184T/184TC	23	5 grey

Figure 2



5 Exploded View and Parts List For FCR Brake Motors

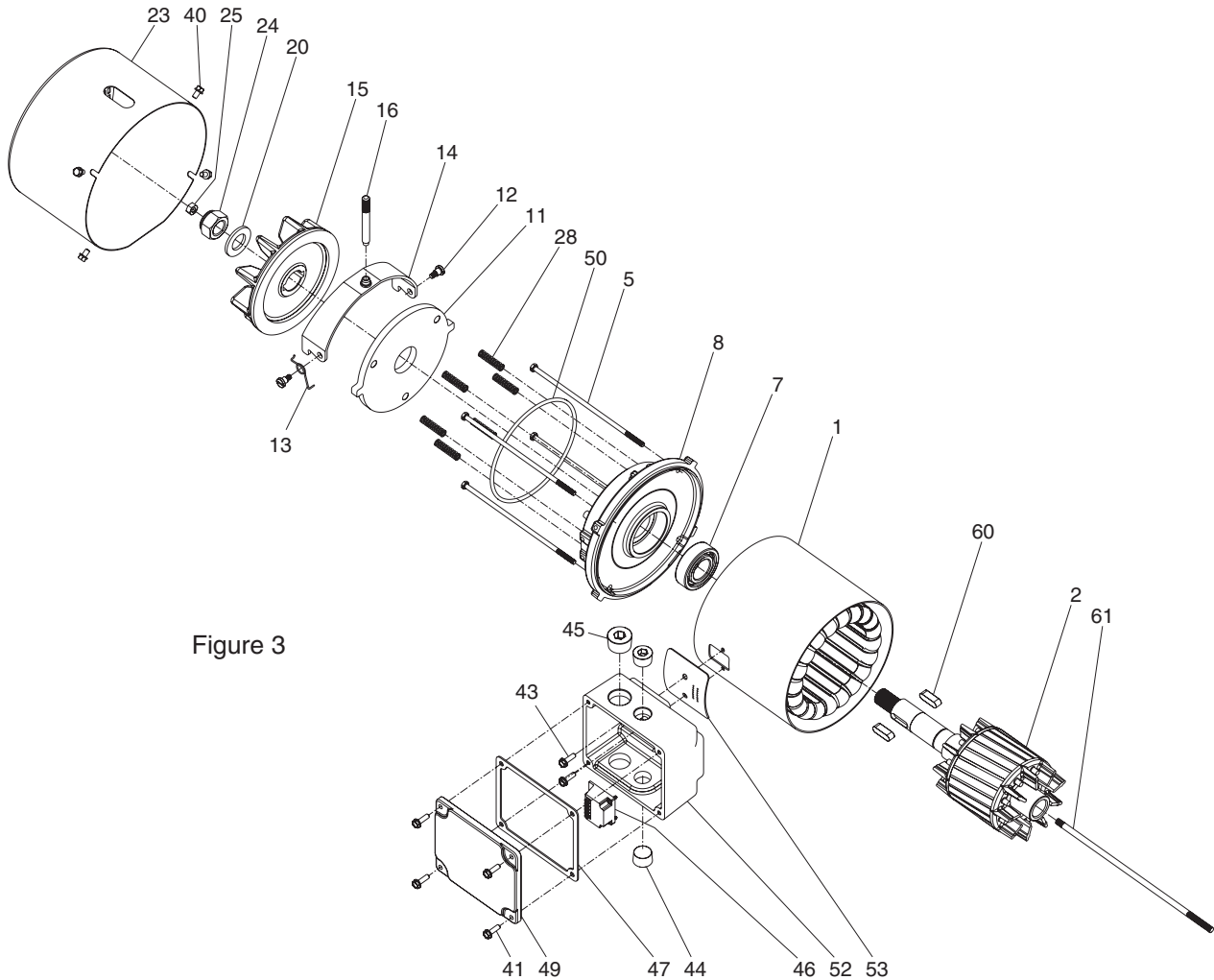


Figure 3

5.2 FCR parts list

Ref.	Description	Qty	Ref.	Description	Qty	Ref.	Description	Qty
1	Wound stator assembly	1	16	Manual release handle	1	45	3/4-14 NPT plugs	1
2	Rotor assembly	1	20	Brake washer	1	46	Brake power rectifier	1
5	Motor stator bolts	4	23	Fan cover guard	1	47	Terminal lid gasket	1
7	Non-drive bearing	1	24	Brake nut	1	49	Terminal box lid	1
8	Brake housing	1	25	Rotor stud nut	1	50	Sealing o-ring	1
11	Brake armature	1	28	Brake Springs	3 to 6	52	Terminal box	1
12	Manual release screws	2	40	Fan screws	4	53	Terminal box gasket	1
13	Manual release spring	1	41	Terminal lid screws	4	60	Rotor shaft keys	2
14	Manual release	1	43	Terminal box mtg. bolts	2	61	Rotor stud	1
15	Brake fan/lining	1	44	1/2-14 NPT plugs	2			

6 Replacement brakemotors and Repair Parts

6.1 Procedure

All orders or quotes for replacement parts must be accompanied by:

- The complete motor type, number of units and the complete nameplate information.
- Reference # and their descriptions per 5 and 5.2 above.

All request for quotes for replacement motors or gearmotors must be accompanied by:

- Complete nameplate information from the motor and the gear nameplates.

7 Troubleshooting Guide

Symptom	Probable Cause(s)	Action Recommended
Abnormal Noise	Originating from motor or driven machine?	<ul style="list-style-type: none"> * Uncouple motor from machinery and run test motor/gearmotor alone. * Test the brake release system.
Noisy Motor	Mechanical causes: if noise persists after switching off the electrical power supply.	
	- Bearing noise	* Check the bearings for damage.
	- Mechanical friction: ventilation, brake disc, coupling	* Check.
	Electrical cause: if noise stops after switching off the electrical power supply.	* Check the power supply at the motor' leads.
	- Normal voltage and 3 phases are balanced	* Check tightness of power connections in the conduit box.
	- Abnormal voltage	* Check the power supply line.
Motor heating up abnormally	- Phase imbalance	* Check the winding resistance and the supply (voltage) balance.
	- Faulty ventilation	<ul style="list-style-type: none"> * Monitor ambient. * Clean the fan cover guard grill and cooling fan. * Check the fan for correct mounting on shaft.
	- Faulty power supply	* Check.
	- Terminal connection fault	* Check.
	- Overload	* Check the current consumption against the nameplate current rating.
	- Partial short-circuit	* Check the electrical continuity of the windings and/or the insulation.
Motor will not start	- Phase imbalance	* Check the winding resistance.
	No load:	Release the brake and with the motor switched off:
	<ul style="list-style-type: none"> - Mechanical locking - Broken supply line 	<ul style="list-style-type: none"> * Check motor shaft rotates freely by hand. * Check fuses, electrical protection, starting device and electrical continuity.
Brake does not release	With load:	When switched off:
	- Phase imbalance	<ul style="list-style-type: none"> * Check the direction of rotation (phase order). * Check resistance and the continuity of the motor windings. * Check electrical protection.
Brake releases but is very noisy	Insufficient supply voltage:	The maximum permissible voltage drop is 15% of the rated voltage.
Brake releases but braking is insufficient	Defective coil:	Replace the coil.
	Air gap is irregular, or is too large: Foreign body in air gap.	Dismantle and clean. Clean the parts.
Brake releases but braking is insufficient	Insufficient pressure on springs.	<ul style="list-style-type: none"> * Check spring quantity and color. * Check air gap.
	If spring pressure is correct.	<ul style="list-style-type: none"> * Check surface condition of the friction lining and the brake armature. * Blow away any friction dust.

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